



Reference: INF-XXX

Mambo Manual

Diffusion :

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1. Introduction

This document is an end-user guide to using the Mambo application, and a brief developer-oriented presentation of the application's architecture.

2. Application's context: Historic and Temporary archiving

The goal is automatically archiving the values of a set of Tango Attributes, in a given time range.

In this time range, the value of an attribute is archived:

- Every [given time interval]

AND

- When the attribute's value meets [given condition on attribute's value]

where [given time interval] and [given condition on attribute's value] are user-defined for each attribute (individually or for a group of attributes).

Each attribute value is associated with a time stamp, representing the time when the attribute value was read; this time stamp is archived as well.

Attributes can be archived in two distinct databases:

- the Historical Data Base (**HDB** henceforth): attributes values are stored forever
- the Temporary Data Base (**TDB** henceforth): every [given deletion time], the oldest attributes values records are deleted. **VERIFIER QUE C'EST BIEN CA**

When an attribute is "being **archived**", it means that every [base time unit], the archiving device tests whether the current value of the attribute has to be stored in HDB (resp. TDB).

If the test is positive, a record is added in the table for this attribute.

Later, those values can be **exploited** (selected from HDB/TDB to be displayed, saved in a file, ...).

3. Application's description and goals

3.1. Application's goals

Mambo allows the user to define *configurations* that describe archiving and data exploitation for a group of attributes. Those *configurations* can be saved as files and modified.

Mambo is thus naturally divided (both in functionalities and display) in two parts:

- The archiving control part
- The archived data exploitation part

3.2. A first look at Mambo

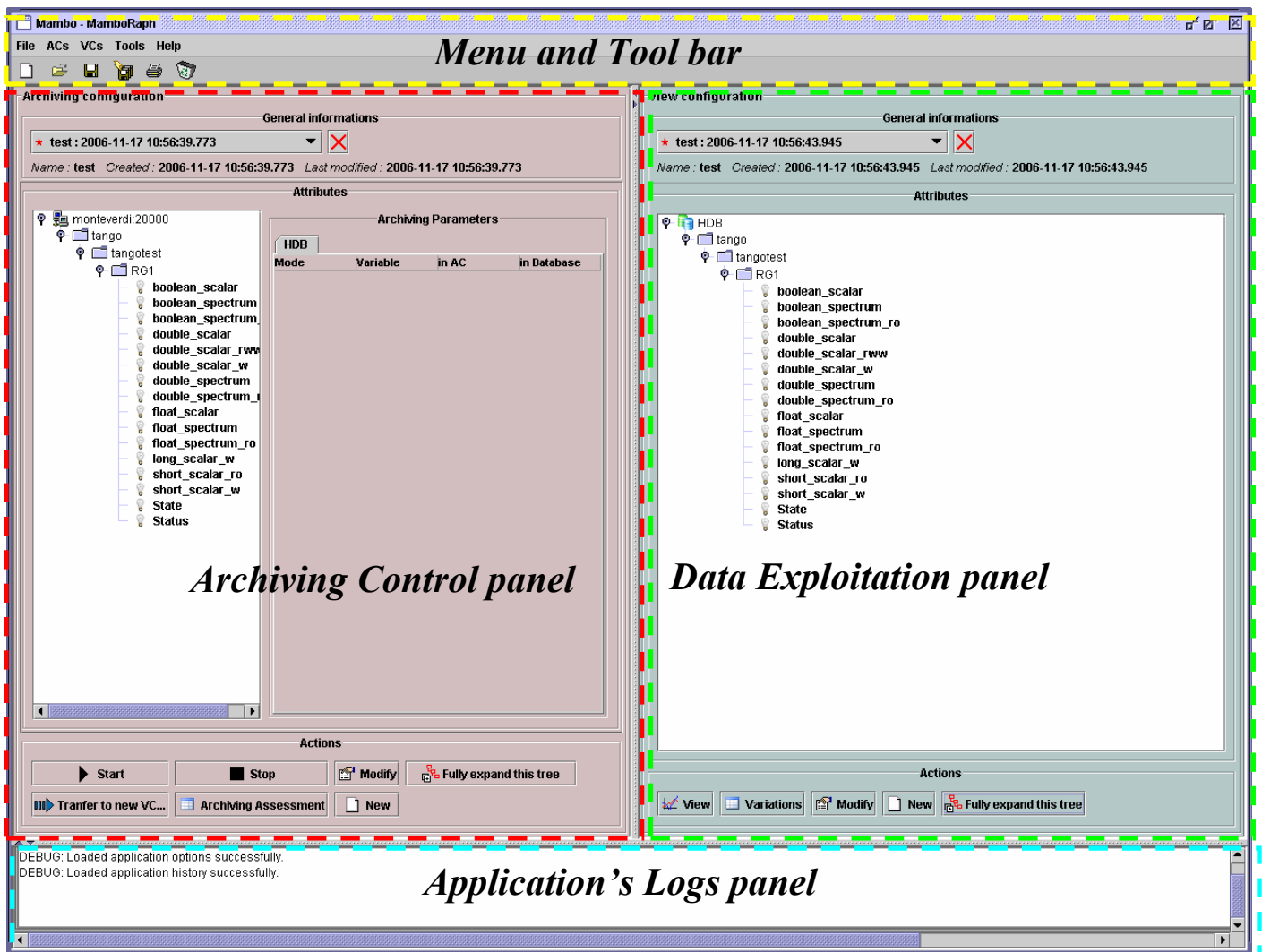


Figure 1: General view of Mambo

- The Archiving Control panel is where the user controls the archiving of Tango attributes to HDB/TDB.

He does so by creating/modifying **Archiving Configurations**, and calling **Start/ Stop** on those configurations.

An **Archiving Configuration** is a list of attributes to be archived, with a list of archiving parameters for each attribute.

- The Data Exploitation panel is where the user exploits the previously stored data, mainly displaying curves and extracting raw data from HDB/TDB.

He does so by creating/modifying **View Configurations**, and calling **View Stop** on those configurations. A **View Configuration** is a list of attributes to be displayed, with a list of displaying parameters for each attribute.

- The Logs panel displays success/failure messages to the user upon realization of an action.
- The Menu and the Tool bar are for actions shortcuts and application's options.

Each panel will be detailed in its own subsection.

4. Control archiving

This section deals with controlling archiving of Tango attributes through **Archiving Configurations** (henceforth **AC**). An AC describes which attributes to archive and how, and consists of :

- General information (when the AC was created, ...)
- A list of attributes to archive
- For each attribute, a set of HDB/TDB archiving modes

ACs are accessed/used in the AC panel :

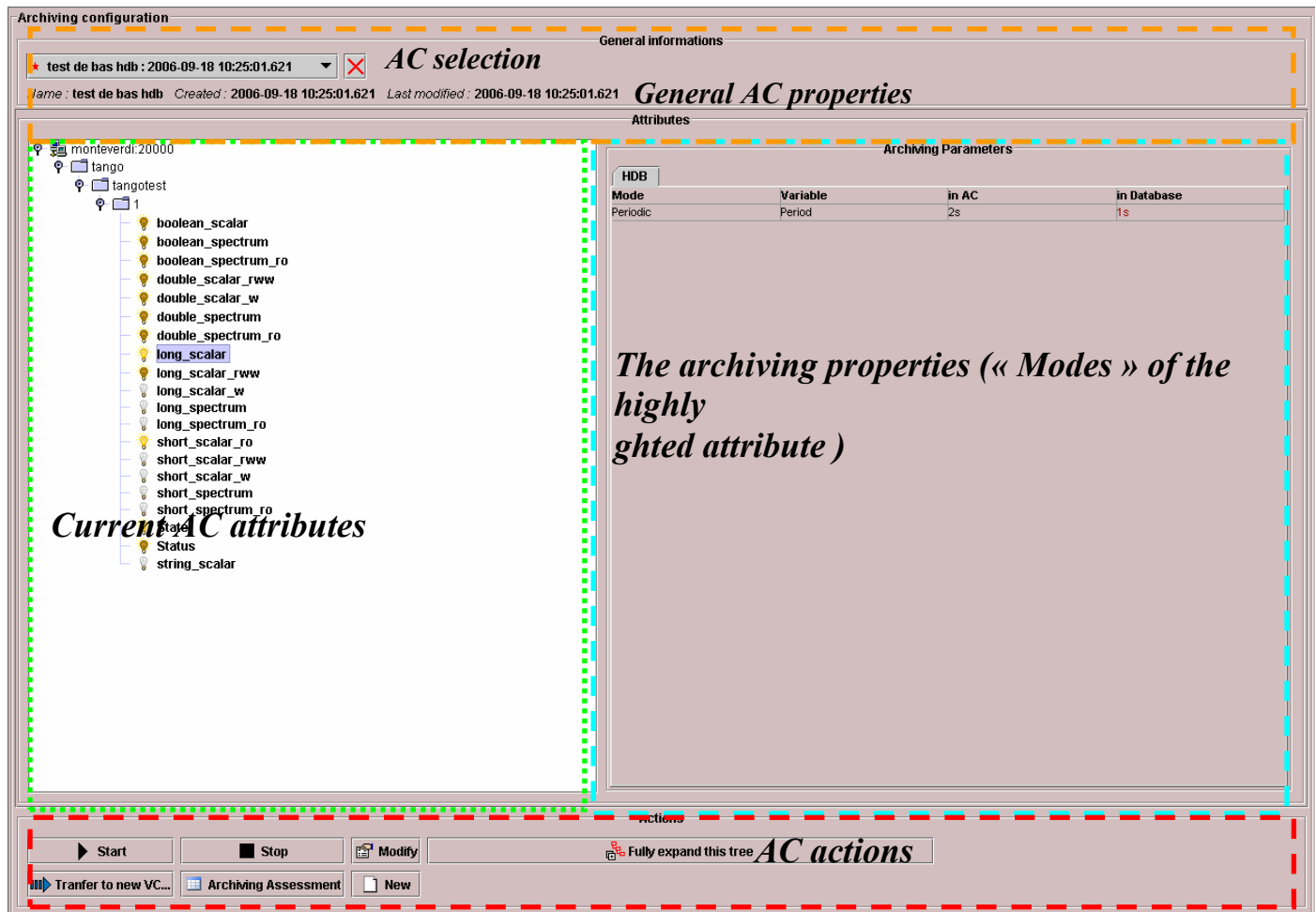


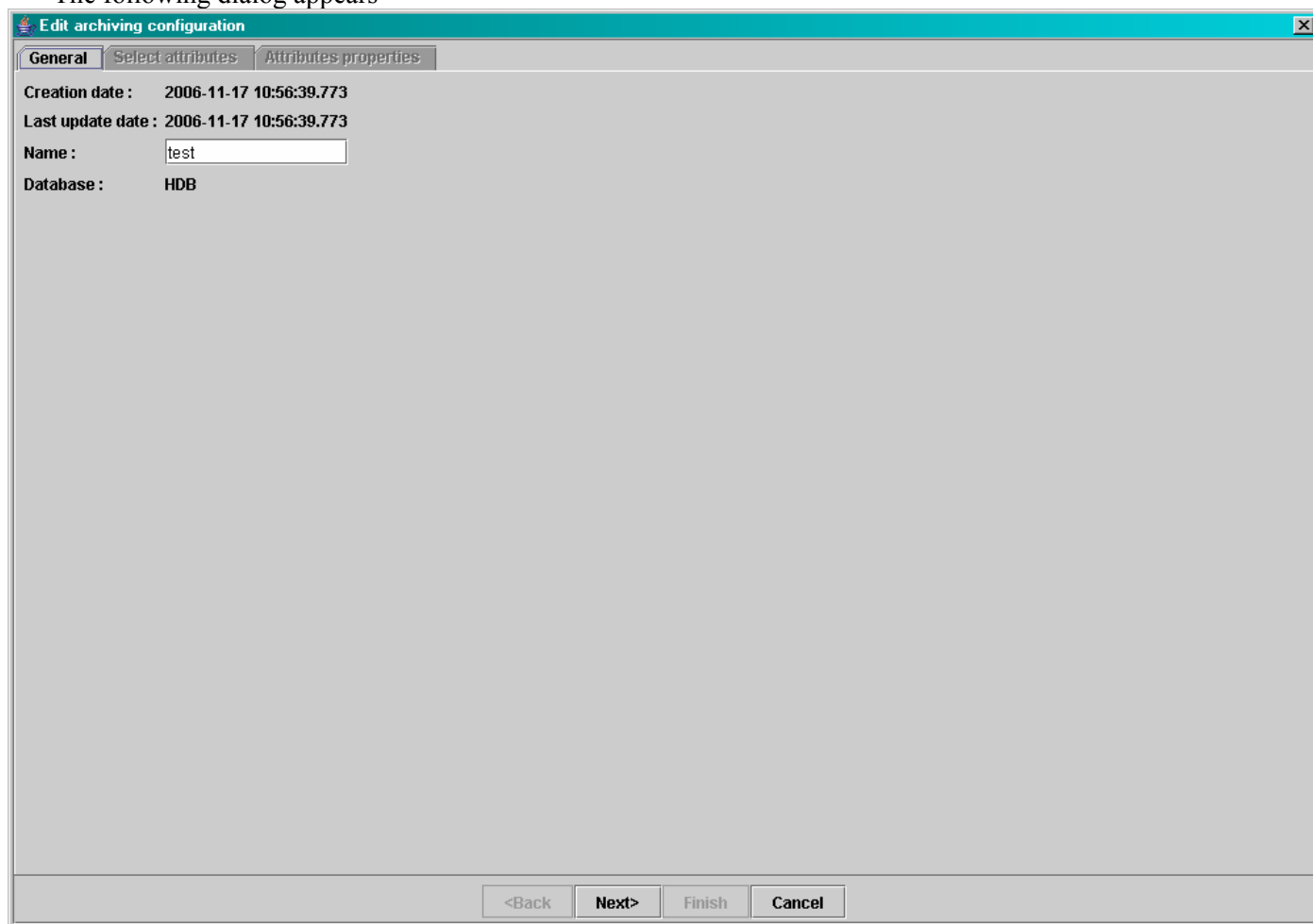
Figure 2: The AC panel (black)

4.1. Creating/modifying an AC

Creation or modification of an AC is done the same way, using the New/Modify button respectively. We will see how to load an AC later.

Step 1 : AC general properties

- Click the New/Modify button in the AC actions panel
- The following dialog appears



The screenshot shows a Windows-style dialog box titled "Edit archiving configuration". It has three tabs: "General" (selected), "Select attributes", and "Attributes properties". The "General" tab contains the following fields:

- Creation date : 2006-11-17 10:56:39.773
- Last update date : 2006-11-17 10:56:39.773
- Name :
- Database : HDB

At the bottom of the dialog, there are four buttons: "<Back", "Next>", "Finish", and "Cancel".

Figure 3: Step1, general properties

- You can choose a name for the AC. This field isn't mandatory but it is recommended to fill it.
- The creation and update dates are filled or modified automatically upon saving an AC. Click next.

Step 2 : Select the AC attributes

There are 2 ways to select the AC attributes. The user can choose a selection method in the Options.

Step 2, method 1:

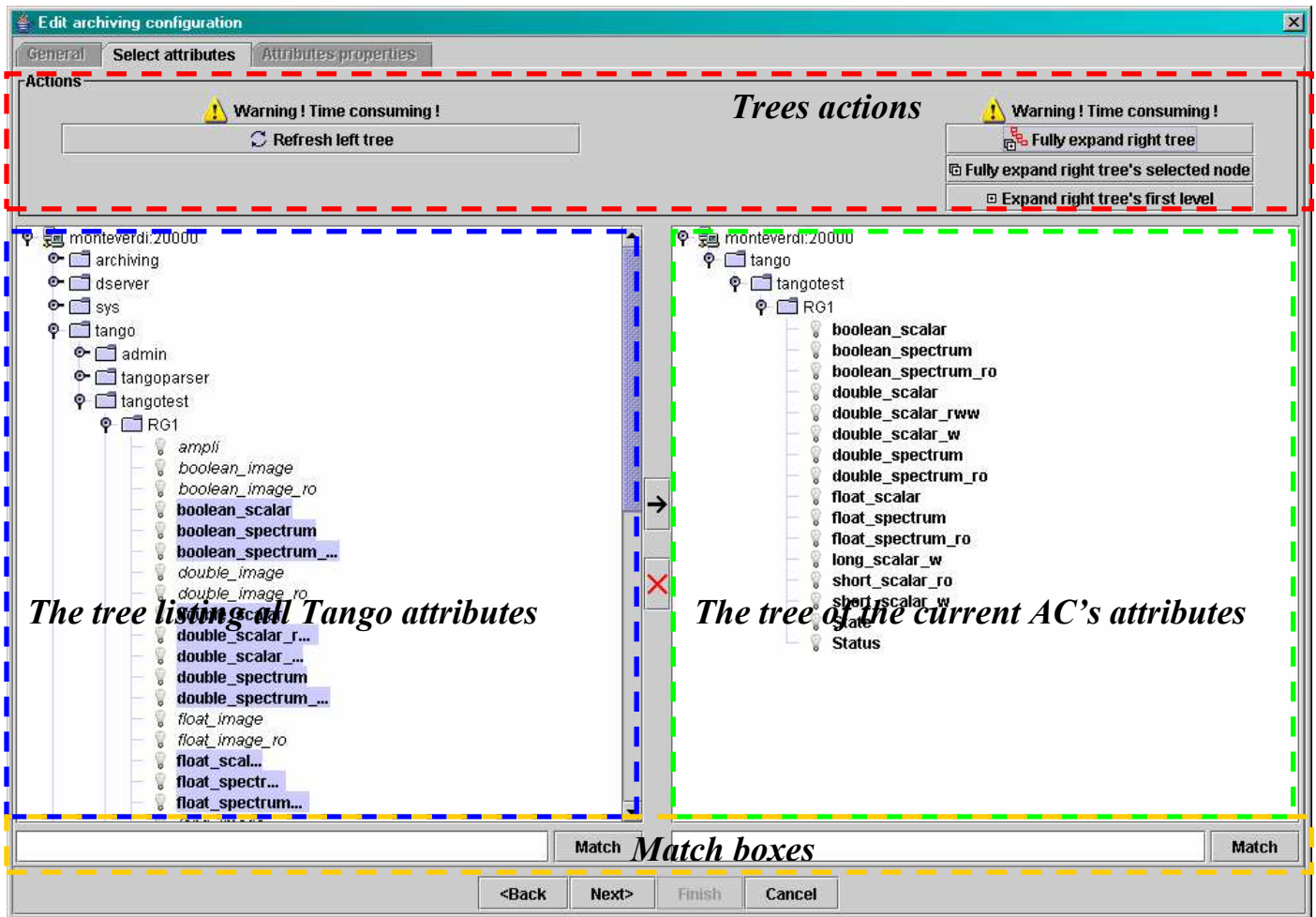


Figure 4: Step 2, select AC attributes (standard method)

- The left tree lists the Tango attributes. The right tree represents the current attributes of the edited AC. Both trees have the same structure of TANGO_HOST/Domains/Families/Members/Attributes.

WARNING The left tree listing the Tango attributes is initially only loaded up to Members level to avoid overloading. The attributes are loaded upon user selection of a Member node

- Adding attributes to the current AC:
 - Select a tree node to expand it.
 - Select attributes in the left tree then press the right arrow to add them to the current AC.
 - Select a node in the left tree then press the right arrow to add all attributes under this node to the current AC (only works if those attributes were loaded).
- Removing attributes from the current AC:
 - Select attributes in the right tree then press the red X to remove them from the current AC.
 - Select a node in the right tree then press the red X to remove all attributes under this node from the current AC.
- Using “Match” to filter attributes:

The user can enter an expression of the form D/F/M and click match to filter attributes in the left and right trees.

D represents the Domains, F represents the Families, and M the Members. All three can contain the joker character ‘*’.

Since the tree loading is initially only up to Member level, it’s not possible to filter up to Attributes level.

Step 2, method 2:

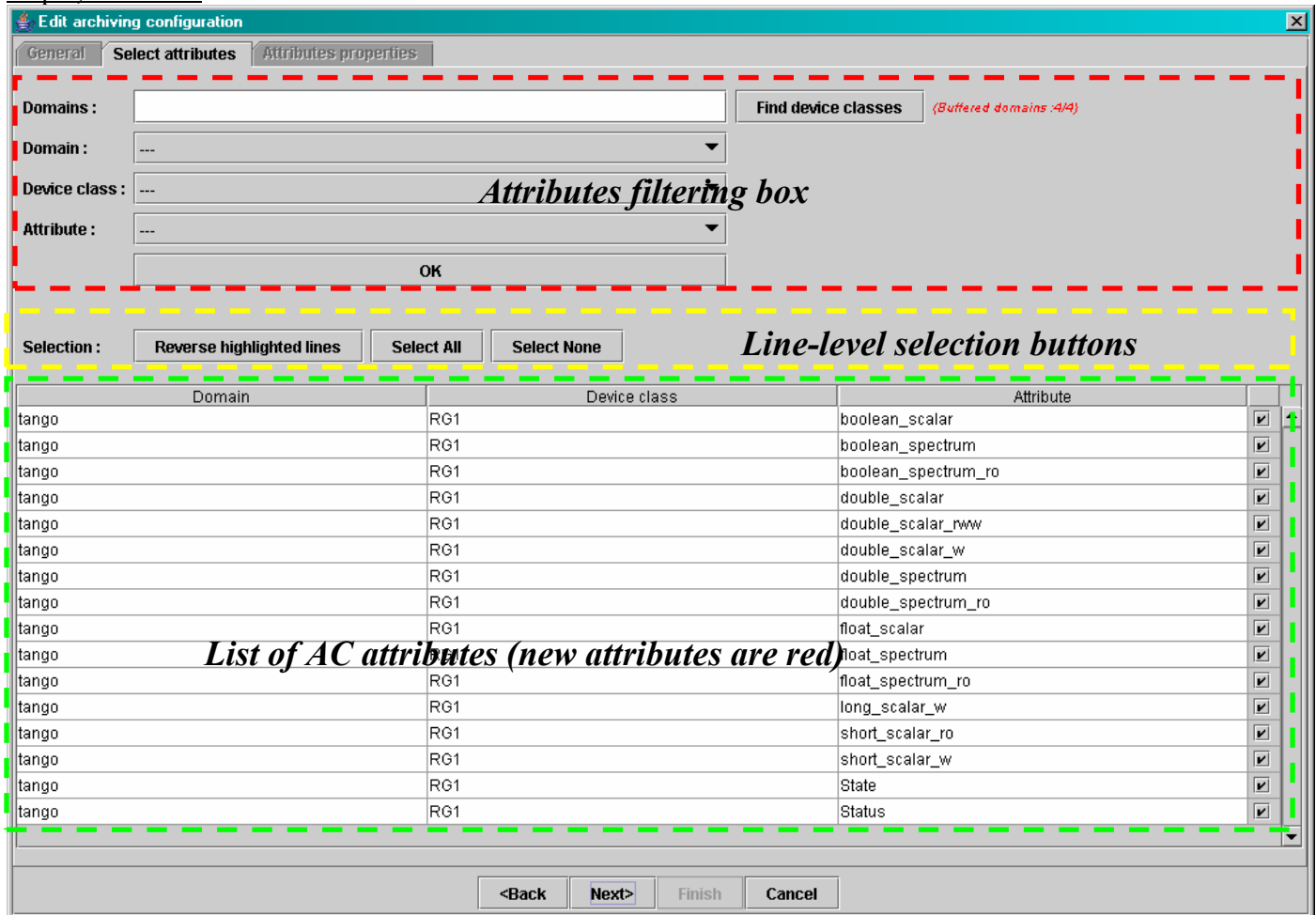


Figure 5: Step 2, select AC attributes (alternate method)

- Attribute selection and automatic attributes adding:
 - Choose a Domain. This refreshes the list of possible Device classes for this Domain.
 - Choose a Device class. This refreshes the list of possible Attributes for this Domain and Device class.
 - Choose an Attribute and press OK :
 - All Attributes
 - with the selected name**AND**
 - belonging to any Device of the selected Class and Domain
 are added to the current AC's list of attributes.

All new attributes are red until the AC is saved.

- Line level sub-selection of loaded attributes:

Each attributes is initially checked, but this check can be removed by the user. When the user clicks on next, all unchecked attributes will be removed from the current AC.

- Click "Select All" to select all lines
- Click "Select None" to select no lines
- Select lines in the list (CTRL and SHIFT are usable), then click "Reverse for selected lines" to reverse the checked/unchecked status of all selected lines.

Step 3 : Set the AC attributes properties

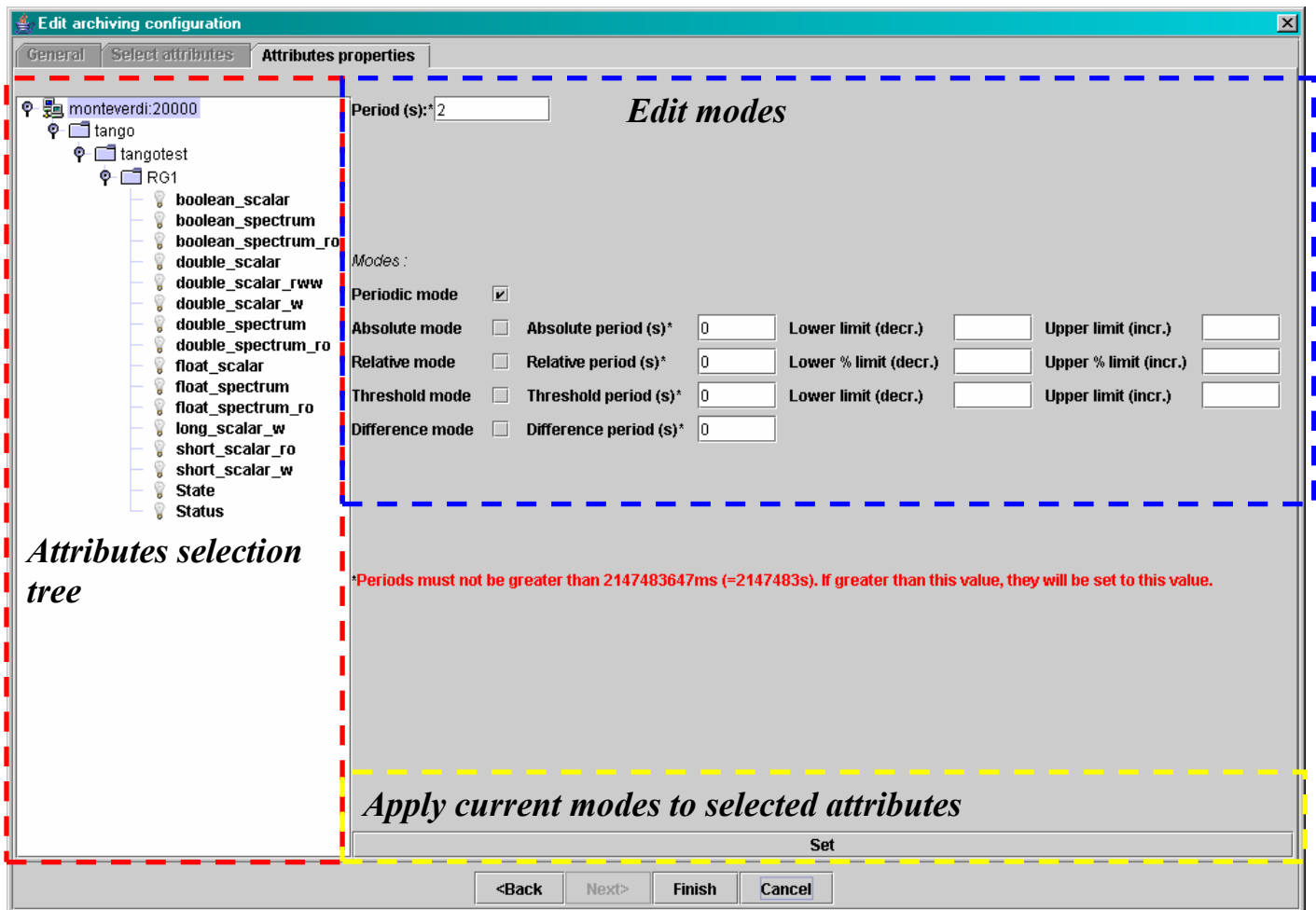


Figure 6: Step 3, selecting archiving modes

- A general description of the properties setting process:

The way you set up archiving modes for each attribute is as follows:

- o Select a group of attributes
- o Edit HDB/TDB modes
- o Call “Set” for the current group of attributes: the currently displayed modes are applied to all attributes of the selection.
- o Repeat with next group of attributes
- o End edition by clicking Finish.

- Attributes selection

The setting up of archiving modes can be “factorized” for a selection of attributes; all attributes of the selection will be set up with the currently displayed properties when the user presses “Set”.

The multiple selection can consist of :

- o A manual select at Attributes level (CTRL and SHIFT are usable)
- o Selection of an upper node level: all Attributes nodes under this node will be set up
- o A combination of the two.

- Unset attributes and default values

Attributes which haven't received any Mode yet (unset) are displayed in *Italic*. Attributes which have (set) are displayed in **Bold**.

Clicking on a set attribute displays its archiving modes.

Clicking on an unset attribute displays default archiving modes.

- Controls upon AC validation

The user can not choose any and all combination of modes, nor any and all numeric values for each mode.

Thus, controls are performed upon call to "Finish":

- o If any HDB (resp. TDB) mode is chosen for a given attribute, it must also have the basic HDB (resp. TDB) Periodic mode.
- o Any unset attribute will be removed from the AC; the user is prompted to continue editing the AC, or ignore them.
- o Numeric values are controlled for each mode.

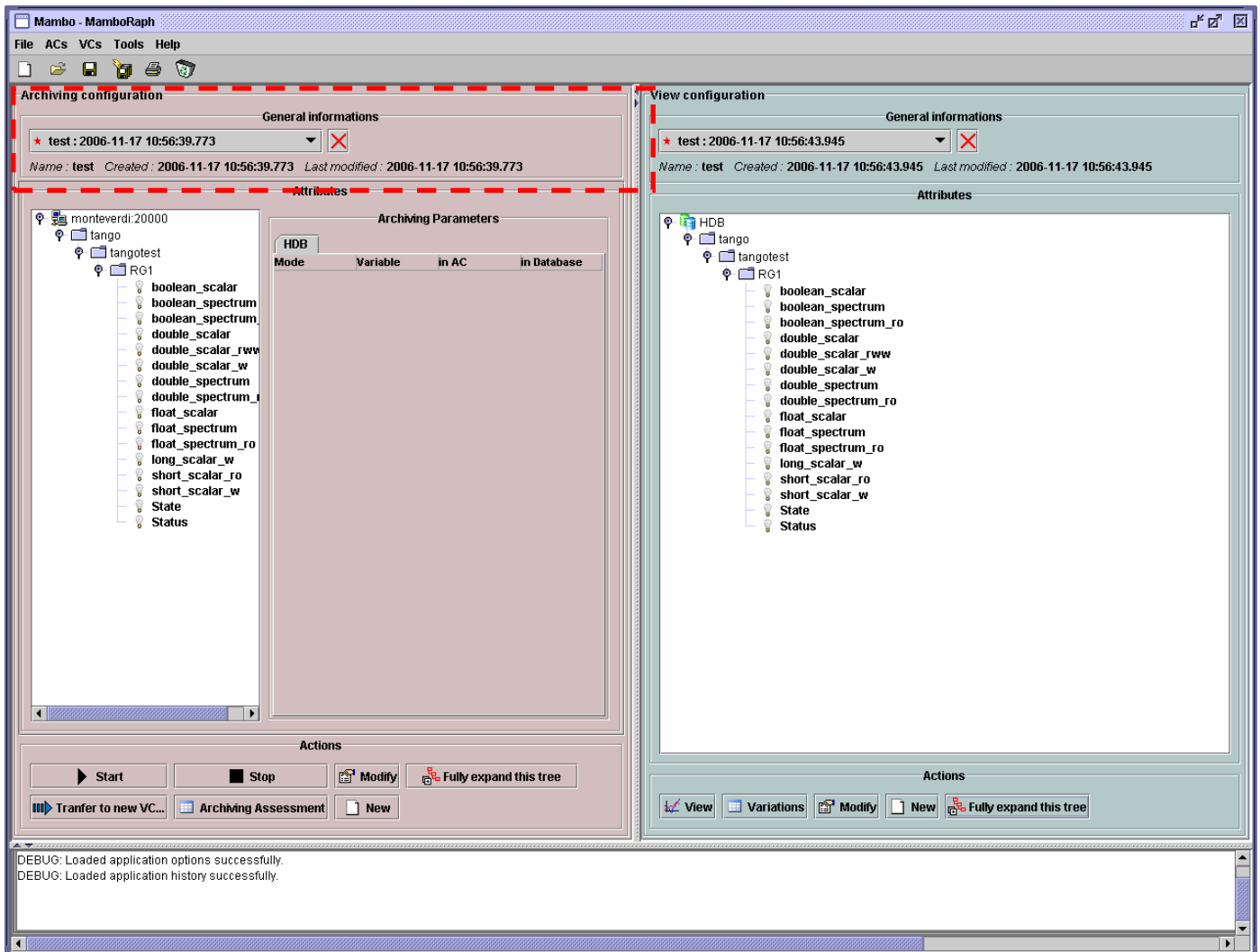
When the validation is over, the AC is displayed in the application's AC panel.

4.2. The opened ACs menu

Mambo can have several opened ACs at once, even if only one is displayed onscreen at a time; a drop-down menu allows the user to choose an AC in the list of opened ACs:

- Each time the user loads an AC, it's added to the top of the opened ACs list (the older ACs are shifted downwards in the opened ACs list)
- The list identifies ACs by their *name* and *date of last update*. When the user selects an AC, it becomes the current AC, and its general information and attributes are displayed.
- To remove an AC from the list, push the red X button (this will do nothing if the list is empty or only has 1 element). The next AC in the reduced list (ie. the one that was added to the list the most recently) is automatically displayed.
- The list can hold no more than *[MAX_NUMBER]* ACs, this number can be defined in the AC tab of the options panel (default =5). If the list's length reaches *MAX_NUMBER*, the oldest AC will be removed from the list when needed.
- ACs that have unsaved modifications are identified by a red star.

If Mambo has the “History save” option turned on, the list of opened ACs will be saved at shutdown, and loaded at startup.



4.3. *Starting/Stopping archiving on an AC*

4.3.1. The Current Archiving Configuration detail panel

Attributes are displayed differently in selection trees, with respect to their current archiving status. The display shows their current status in DB, not their archiving modes in the current AC.

- Attributes that aren't being archived are displayed as off bulbs: 
- Attributes that are being archived only in HDB are displayed as on, yellow bulbs: 
- Attributes that are being archived only in TDB are displayed as on, brown bulbs: 
- Attributes that are being archived in HDB and TDB are displayed as on, bicolor bulbs: 

4.3.2. Starting/Stopping archiving on an AC

Starting archiving:

- Create/Load an AC or just use the current AC. The AC that will be used is the one displayed in the application's AC panel.
- Call Start to start archiving each attribute by all its modes

Stopping archiving:

- Create/Load an AC or just use the current AC. The AC that will be used is the one displayed in the application's AC panel.
- Call Stop to stop archiving of each attribute. All archiving modes will be stopped.

In both cases a success/failure message confirms the action.

The Current Archiving Configuration panel

4.4. Displaying an AC

4.4.1. The Current Archiving Configuration detail panel

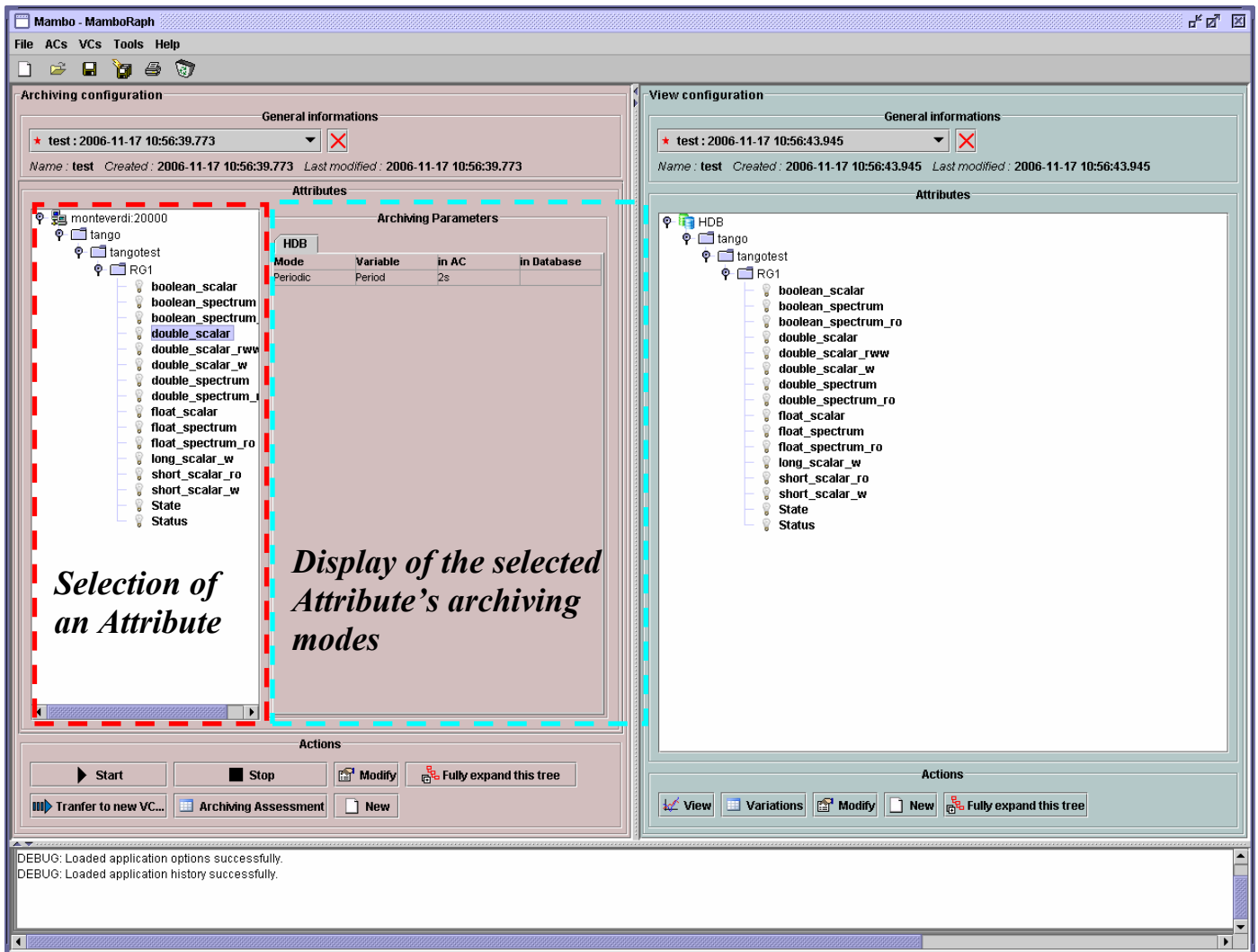


Figure 7: Detail of the current AC

This panel represents the current Archiving Configuration.

On the left, a tree lists all of the AC's attributes.

When the user selects a given attribute on this tree, its HDB and TDB modes are displayed on the right sub-panel.

This displays the attributes modes individually; to get a global view of the AC's Archiving Modes, use the "Archiving assessment" command.

4.4.2. The Archiving assessment window

Attribute Name	Mode	Variable	in AC	in Database
tango/tangotest/1/boolean_scalar	Periodic	period	2s	
tango/tangotest/1/boolean_spectrum	Periodic	period	2s	
tango/tangotest/1/boolean_spectrum_r	Periodic	period	2s	
tango/tangotest/1/double_scalar_rvw	Periodic	period	2s	
tango/tangotest/1/double_scalar_vw	Periodic	period	2s	
tango/tangotest/1/double_spectrum	Periodic	period	2s	
tango/tangotest/1/long_scalar	Periodic	period	2s	
tango/tangotest/1/long_scalar_rvw	Periodic	period	2s	1s
tango/tangotest/1/long_scalar_vw	Periodic	period	2s	
tango/tangotest/1/long_spectrum	Periodic	period	2s	
tango/tangotest/1/long_spectrum_ro	Periodic	period	2s	
tango/tangotest/1/short_scalar_ro	Periodic	period	2s	
tango/tangotest/1/short_scalar_rvw	Periodic	period	2s	2s
tango/tangotest/1/short_scalar_vw	Periodic	period	2s	

Figure 8: Global view of all the modes of an AC

This window sums up the current Archiving Configuration in two tabs (one for HDB, one for TDB).

For each attribute contained in the current AC, its archiving modes are detailed, and if the attribute is being archived, can be compared to the modes values found in HDB (resp. TDB).

4.5. Saving/Loading an AC

4.5.1. Saving an individual AC

Archiving Configurations are saved/loaded as XML files, with the .ac file extension.

In the menu, select “ACs/Save” or “File/Save/Archiving configuration”:

Save operations work like they do with Word (for example):

- The first time a file is saved, the user is prompted to choose a path and file name; initially the file chooser dialog is in the “ac” subdirectory of the Mambo working directory. The “.ac” file extension is automatically added if the user doesn’t.
- If a file has already been saved, it will automatically be saved in the same file the next time the “Save” menu is selected.
- The user can still specify a different file, by using the “ACs /Save as” menu (or “File/Save As/Archiving configuration”)

When an AC is loaded, it becomes the current Archiving Configuration., and it is added to the list of opened ACs.

In both cases, a success/failure message confirms the action.

4.5.2. Saving all opened ACs

It is possible to save all opened ACs. Only modified ACs will be saved (ie. the ACs that have a “red star”). In the menu, select “ACs/Save All”:

For each modified AC, the save operation will follow the same rules as an individual save:

- If the file has already been saved before, it will be saved silently.
- Otherwise, the user will be prompted to choose a directory and file.
In this case, the ACs that are being saved are successively selected before each file chooser prompt (so that the user knows what AC he’s choosing a path for).

The generic “Save All” menu item in “File/ Save All” does this, plus the same thing for opened VCs.

4.6. *Transfer to VC*

This functionality is used to quickly create a VC on the same attributes as a given AC; for example, when the user wants to monitor the values of attributes after starting archiving on an AC.

It will create a VC automatically, with the following properties:

- Its attributes list is the same as the AC the “Transfer to VC” functionality is used on
- The attributes values are all extracted from HDB, even if some of the AC’s attributes were only archived in TDB (obviously, the display for such an attribute will be empty).
- The date range a 1 hour range ending at the VC’s creation time
- Every Attribute has an automatically determined color (if there are more attributes than colors to choose from, different attributes will have the same color).

5. Exploit archived data

This section deals with controlling exploitation of archived attributes (HDB/TDB) through **View Configurations** (henceforth **VC**).

A VC describes which attributes to display and how, and consists of:

- General information (when the VC was created, the date range to extract ...)
- A list of attributes to display
- For each attribute, a set of display properties.

The archived attributes of a VC either all come from HDB or all come from TDB, since it wouldn't make sense to display HDB and TDB attributes in a common plot.

VCs are accessed and used in the VC panel:

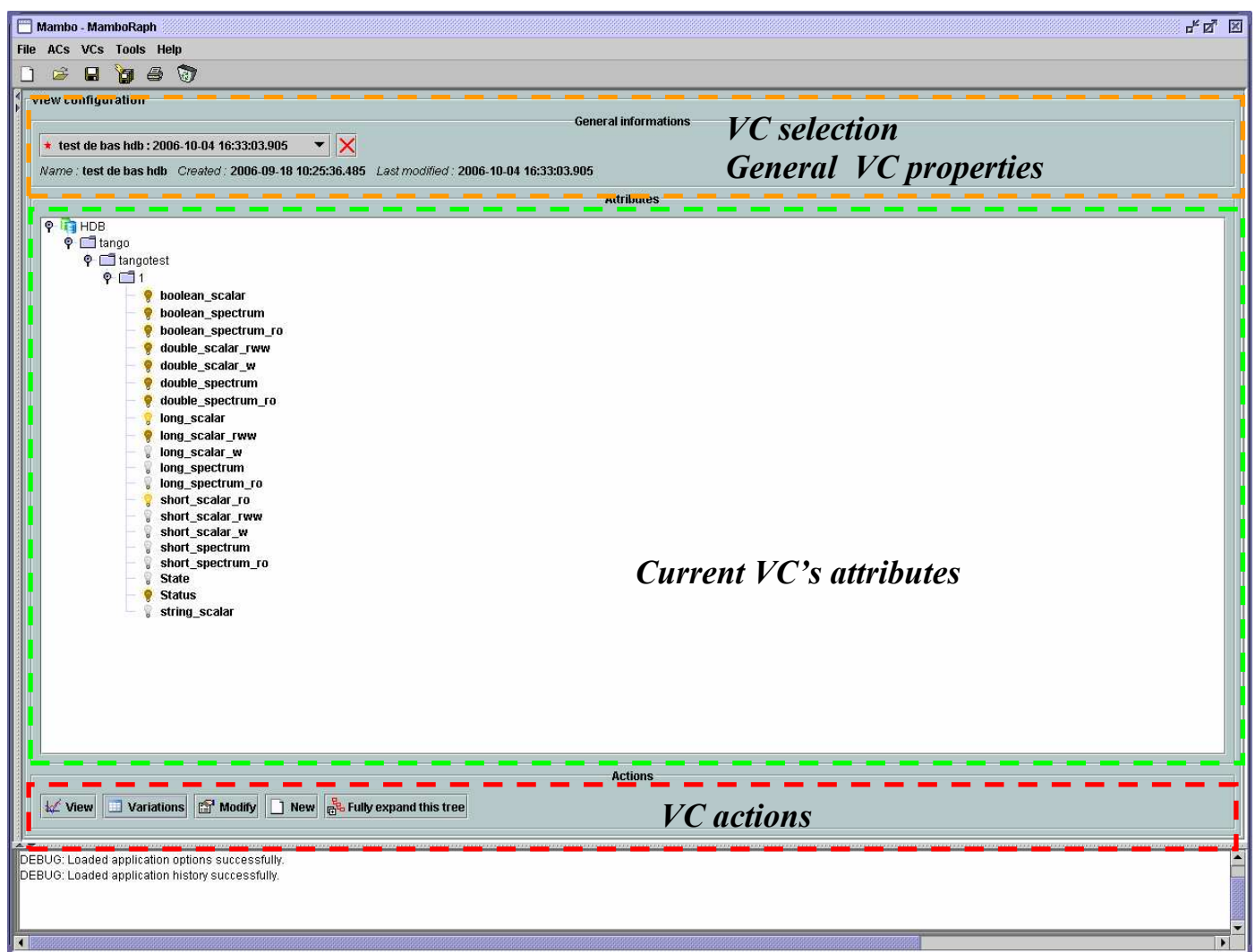


Figure 9: The VC panel

5.1. Creating/modifying an VC

Creation or modification of a VC is done the same way, using the New/Modify button respectively. We will see how to load a VC later.

Step 1 : VC general properties

Those properties don't depend on a specific attribute, they are common to all VC attributes or describe the VC. Click the New/Modify button in the VC actions panel; the following dialog appears:

The screenshot shows the 'Edit view configuration' dialog box with the 'General' tab selected. The dialog is divided into several sections:

- VC Identification:** Includes a 'Historic' checkbox (checked), 'Creation date' (2006-11-17 10:56:43.945), 'Last update date' (2006-11-17 10:56:43.945), and a 'Name' text field containing 'test'.
- Time range:** Includes a 'Date range' dropdown (set to 'Last hour'), 'Start date' (2006-11-17 10:13:08.489), 'End date' (2006-11-17 11:13:08.489), and a 'Dynamic Date Range' checkbox (checked).
- Averaging options:** Includes an 'Averaging period' dropdown (set to 'None').
- General, Y1Axis, Y2Axis tabs:** The 'General' tab is active, showing:
 - Legends:** A 'Visible' checkbox (checked) and a 'Placement' dropdown (set to 'Bottom').
 - Colors & Fonts:** Includes 'Chart background' (a red color swatch), 'Header font' (with 'Sample text'), and 'Label font' (with 'Sample 0123456789').
 - Axis grid:** Includes a 'None' dropdown and a 'Style' dropdown (set to 'Solid').
 - Misc:** Includes 'Chart title' (empty text field), 'Display duration (s)' (0), and 'Synchronization error margin (ms)' (1000).

At the bottom of the dialog are four buttons: '<Back', 'Next>', 'Finish', and 'Cancel'.

Figure 10: Step 1, general properties

Step 1.1 : VC properties

- You can choose a name for the VC. This field isn't mandatory but it is recommended to fill it.
- The creation and update dates are filled automatically upon saving the VC.
- The user must define a date range (Start/End dates) to extract data from. This can be done either manually, or by selecting a "Since xxx" item in the "Date range" drop-down menu.
In the latter case, the user can check the "Dynamic date range". What this option does is recalculate the Start/End dates at each edition of the VC.

Example: At 09:00 the user chose "Last 1 hour" as the "since option".

The date range will be [08:00-09:00].

If the VC is then edited at 11:00, and "Dynamic date range" was checked, the date range will be [10:00-11:00]; otherwise it will still be [08:00-09:00].

- If the "Historic" checkbox is checked, VC attributes will be chosen among HDB attributes (otherwise, TDB).

Step 1.2 : General chart properties

- The user can define global chart properties (title, background, ...)

Step 1.3 : Y1 axis properties

Edit view configuration

General | Select attributes | Attributes plot properties and factor

VC Identification

Historic: ☒

Creation date : 2006-11-17 10:56:43.945

Last update date : 2006-11-17 10:56:43.945

Name: test

Time range

Date range: Last hour

Start date : 2006-11-17 10:13:08.489

End date : 2006-11-17 11:13:08.489

Dynamic Date Range: ☒

Averaging options

Averaging period: None

General | **Y1Axis** | Y2Axis

Scale

Min 0.0 Max 0.0

Mode Linear

☒ Auto scale

Axis settings

Label format Automatic

Title

Color

Position Left

☐ Show sub grid ☐ Draw opposite

☒ Visible

<Back Next> Finish Cancel

Figure 11: Step 1, general properties (continued)

- The user can define the left vertical axis properties (title, scale, ...)

Step 1.4 : Y2 axis properties

- The user can define the right vertical axis properties (title, scale, ...)

Step 2 : Select the VC attributes

The attributes selection works the same way as an AC attributes selection, except for two differences:

- The only available selection mechanism is the tree selection
- The trees are initially loaded to the attributes level.

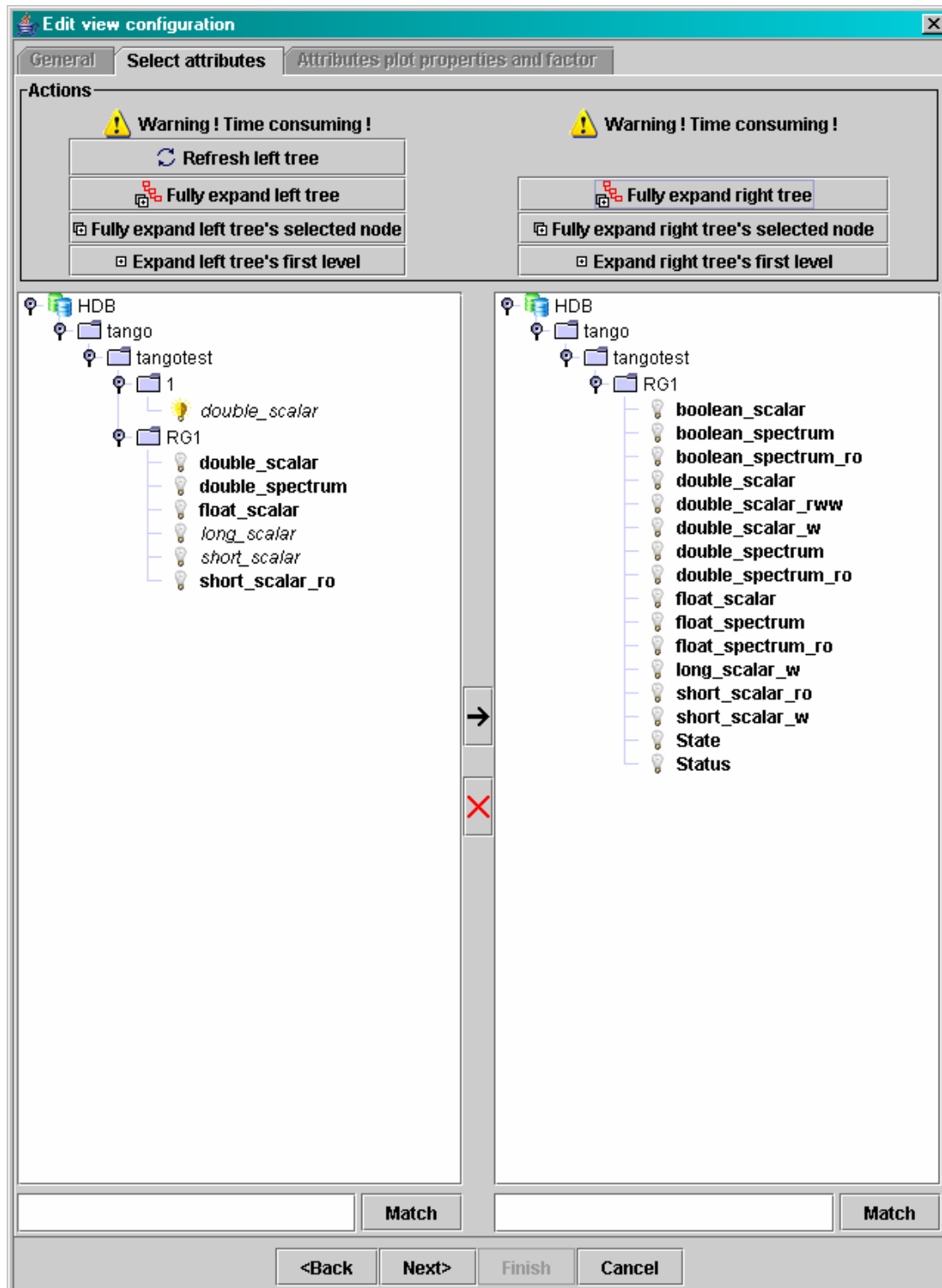


Figure 12: Step 2, selecting attributes

- The left tree lists the HDB (resp. TDB) attributes. The right tree represents the current attributes of the edited VC.

Both tree have the same structure of HDB (resp. TDB)/Domains/Families/Members/Attributes.

WARNING Unlike AC trees, VC trees are initially loaded to the Attributes level since archived attributes are a small subset of all Tango attributes.

- Consequently, the match functionality works up to attributes names: one can use a D/F/M/A criterion.

Step 3 : Set the VC attributes properties

- General flow

See ACs.

- Attributes selection

See ACs.

- Controls upon VC validation

- Any unset attribute will be removed from the VC; the user is prompted to continue editing the VC, or ignore them.
- The VC's date range is controlled

When the validation is over, the VC is displayed in the application's VC panel.

5.2. *The opened VCs menu*

See 4.2 the opened ACs menu.

5.3. Using View on a VC

Once a valid VC has been defined, the “View” button can be used to display a plot showing the VC’s attributes values with respect to time in the specified time range.

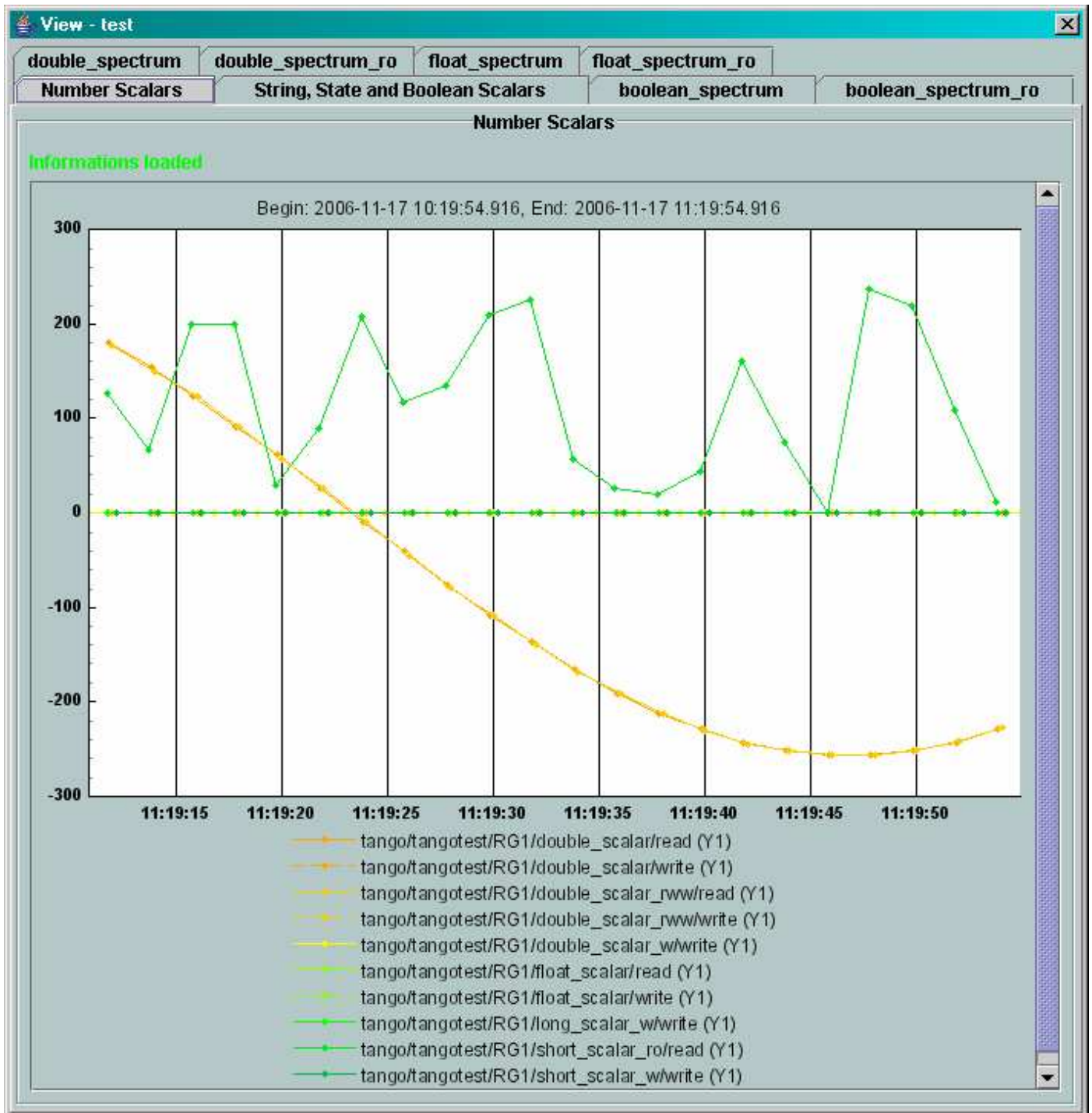


Figure 13: A plot example with 2 read/write attributes

5.4. Displaying a VC

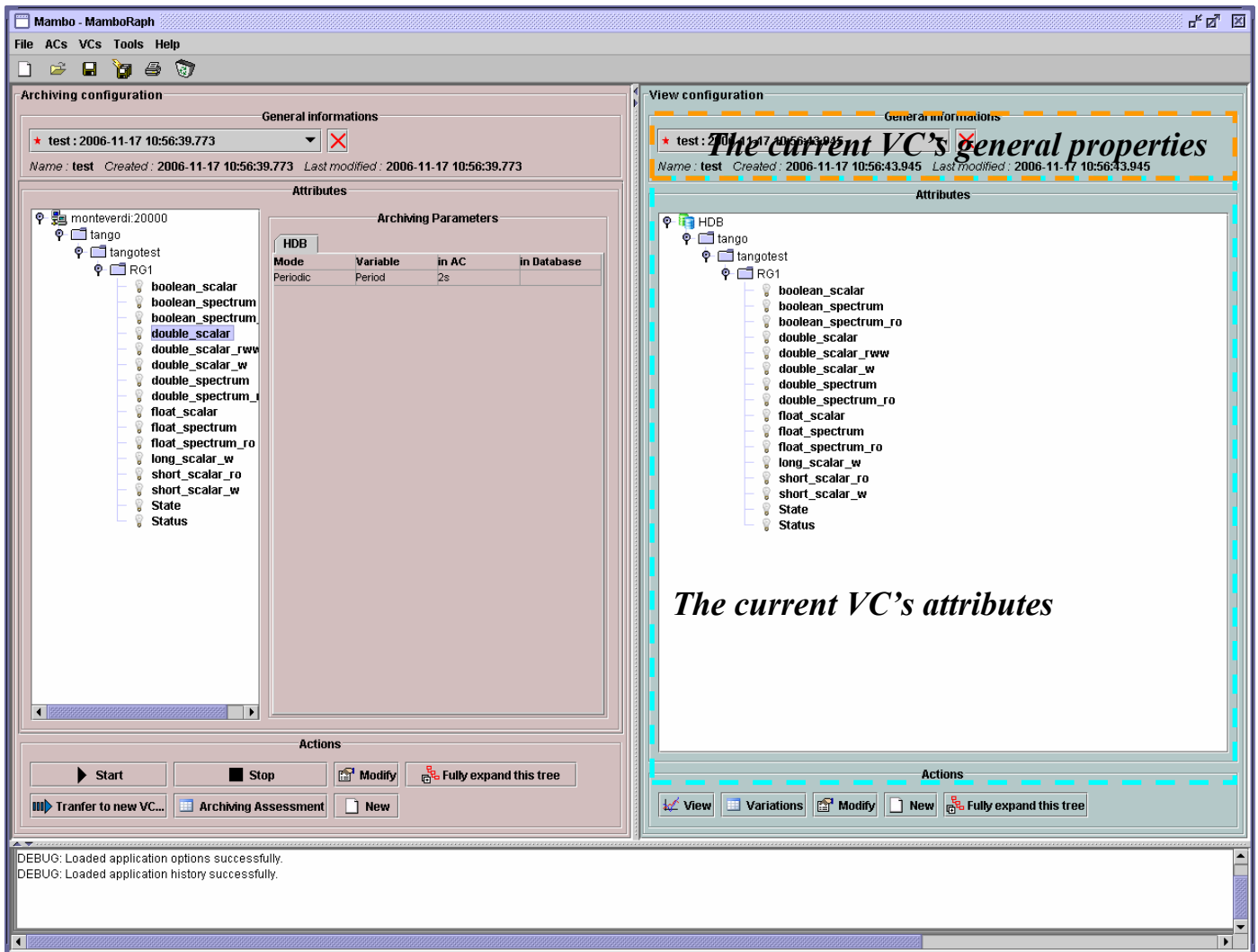


Figure 14: The current VC panel

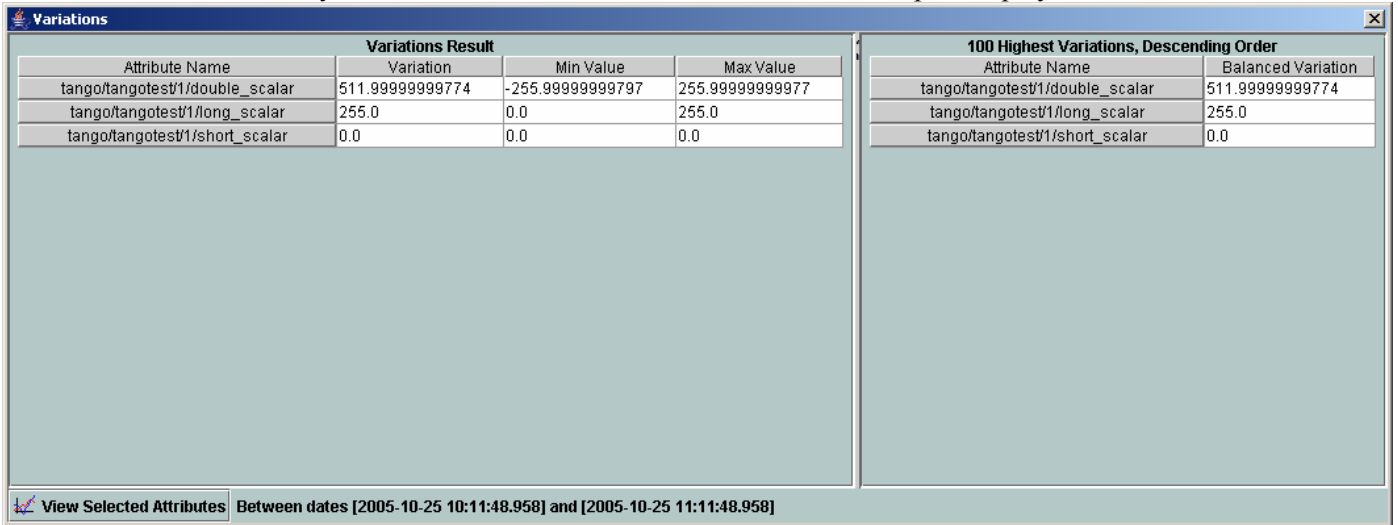
This panel represents the current View Configuration; a tree lists all the VC's attributes. To view specific parameters, the user must use the "Modify" button.

5.5. Saving/Loading a VC

See ACs.

5.6. Using the Variations functionality

The Variations functionality is a filter that comes between a VC and the final plot display.



Variations Result			
Attribute Name	Variation	Min Value	Max Value
tango/tangotest1/double_scalar	511.99999999774	-255.99999999797	255.99999999977
tango/tangotest1/long_scalar	255.0	0.0	255.0
tango/tangotest1/short_scalar	0.0	0.0	0.0

100 Highest Variations, Descending Order	
Attribute Name	Balanced Variation
tango/tangotest1/double_scalar	511.99999999774
tango/tangotest1/long_scalar	255.0
tango/tangotest1/short_scalar	0.0

View Selected Attributes Between dates [2005-10-25 10:11:48.958] and [2005-10-25 11:11:48.958]

Figure 15: The "variations" attributes selection window

The Variations window lists the VC attributes and their “variation”, which is defined as the difference between the min and max values in the VC’s date range.

The user can then select attributes which variations seem abnormal or interesting, and only plot those attributes.

The Variations window is made of two different tables:

- The first one shows for every attribute its minimum and maximum values, and its variation.
- The second one gives the 100 highest balanced variations (the balancing factor of each attribute having been defined earlier in the VC).

Select lines in the left table, and press “View Selected Attributes” to display the filtered plot.

6. Options

Mambo manages global options. Those options are saved on application shutdown, and loaded on startup. The Options menu is located in the Menu bar : Tools→Options.

6.1. *Logs options*

Choose the application's log level.

Verbosity ranges from DEBUG (highest) to CRITIC (lowest), at least WARNING is recommended.



Figure 16: Logs options (setting up verbosity)

6.2. Application's history save/load options

Define whether Mambo has a history, ie. a persistent state when closed/reopened.

If Yes is checked, a XML History file will be saved in Mambo's workspace, and on next startup the current AC and VC will be loaded.

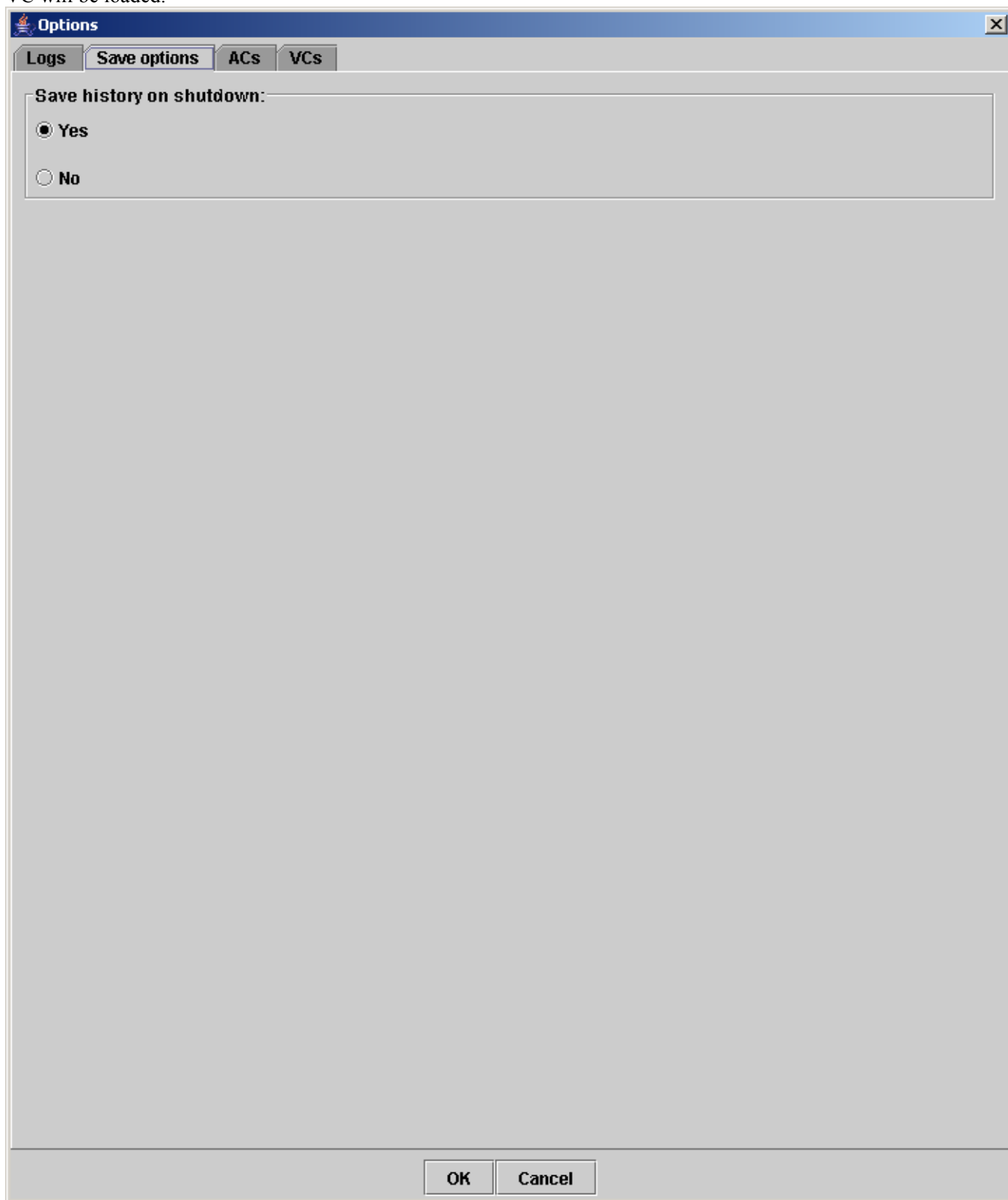


Figure 17: The history options

6.3. *AC options*

Options for all Archiving Configurations; the user can define:

- An attribute selection mechanism for AC edition (see ACs)
- Default modes selection and values for HDB and TDB archiving (see ACs)
 - The selected modes and values will be preset for all unset attributes .
 - The default values can be saved to /loaded from an Archiving Configurations Defaults file (.acd extension)
 - The “Restore defaults” button reloads the defaults with non user-modifiable predefined values.
- The size of the “AC stack”, that is the maximum number of opened ACs.

Options

Logs Save options **ACs** VCs General

Attributes selection

☐ Tree

☒ Table

Default values

HDB

Period (s):*

Modes :

Periodic mode ☒

Absolute mode ☐ Absolute period (s)* Lower limit (decr.) Upper limit (incr.)

Relative mode ☐ Relative period (s)* Lower % limit (decr.) Upper % limit (incr.)

Threshold mode ☐ Threshold period (s)* Lower limit (decr.) Upper limit (incr.)

Difference mode ☐ Difference period (s)*

*** Periods must not be greater than 2147483647ms (=2147483s). If greater than this value, they will be set to this value.**

TDB

Period (ms):*

Export period : ▼

Keeping period : ▼

Modes :

Periodic mode ☒

Absolute mode ☐ Absolute period (ms)* Lower limit (decr.) Upper limit (incr.)

Relative mode ☐ Relative period (ms)* Lower % limit (decr.) Upper % limit (incr.)

Threshold mode ☐ Threshold period (ms)* Lower limit (decr.) Upper limit (incr.)

Difference mode ☐ Difference period (ms)*

Save Load Restore defaults

Miscellaneous

Stack depth :

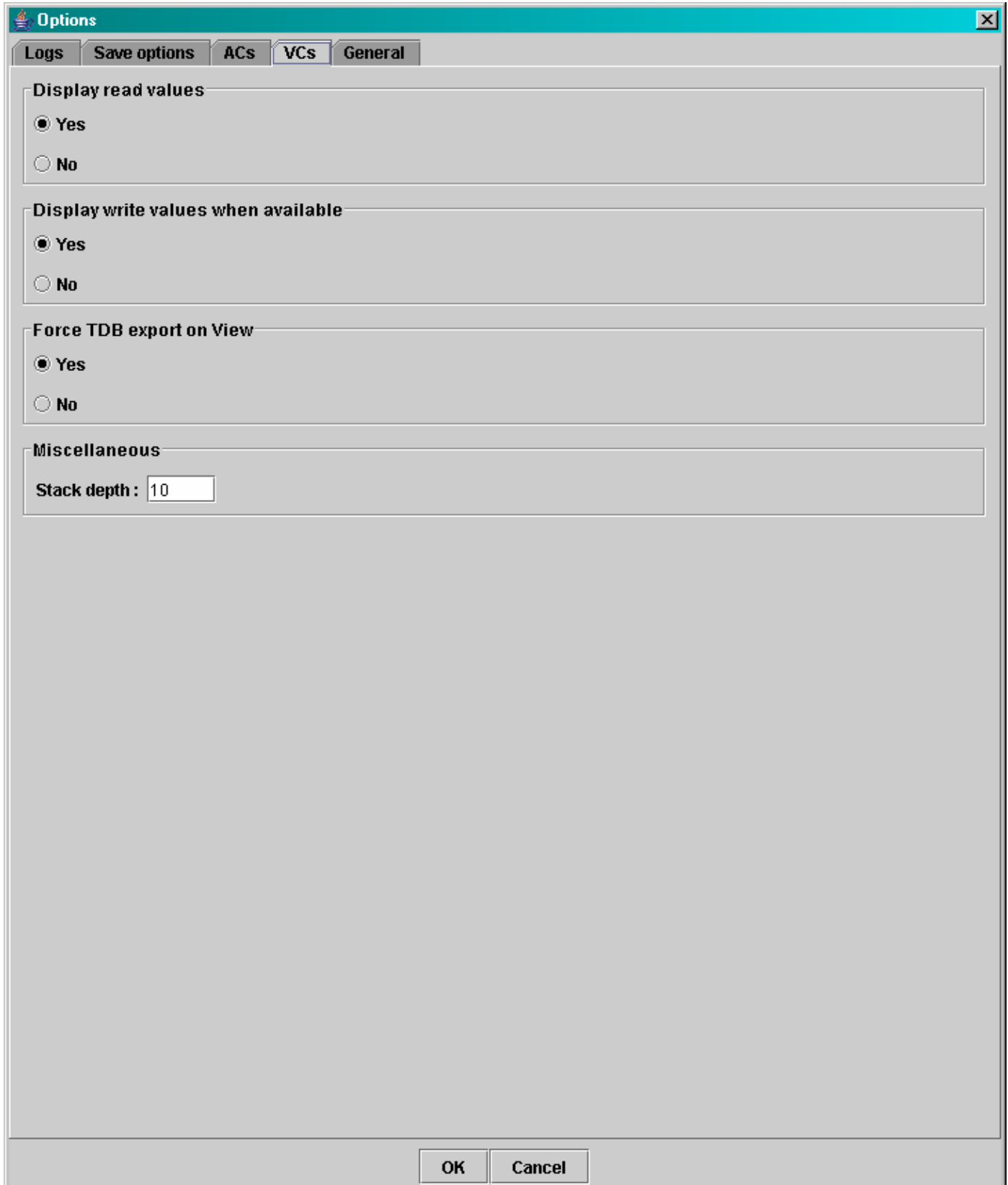
OK Cancel

Figure 18: The AC options

6.4. VC options

Options for all View Configurations; the user can define

- Whether he wants to display the Read value of attributes only, the Write value only, or both.
- The size of the “VC stack”, that is the maximum number of opened VCs.



The screenshot shows a dialog box titled "Options" with a teal header bar. Below the header are five tabs: "Logs", "Save options", "ACs", "VCs", and "General". The "VCs" tab is currently selected. The dialog contains four sections, each with a title and a group box:

- Display read values**: Contains two radio buttons, "Yes" (selected) and "No".
- Display write values when available**: Contains two radio buttons, "Yes" (selected) and "No".
- Force TDB export on View**: Contains two radio buttons, "Yes" (selected) and "No".
- Miscellaneous**: Contains a label "Stack depth:" followed by a text input field containing the value "10".

At the bottom of the dialog are two buttons: "OK" and "Cancel".

Figure 19: The VC options

7. The Mambo toolbar

The toolbar is located under the menu bar, and consists mainly of a set of shortcuts to often used functionalities.

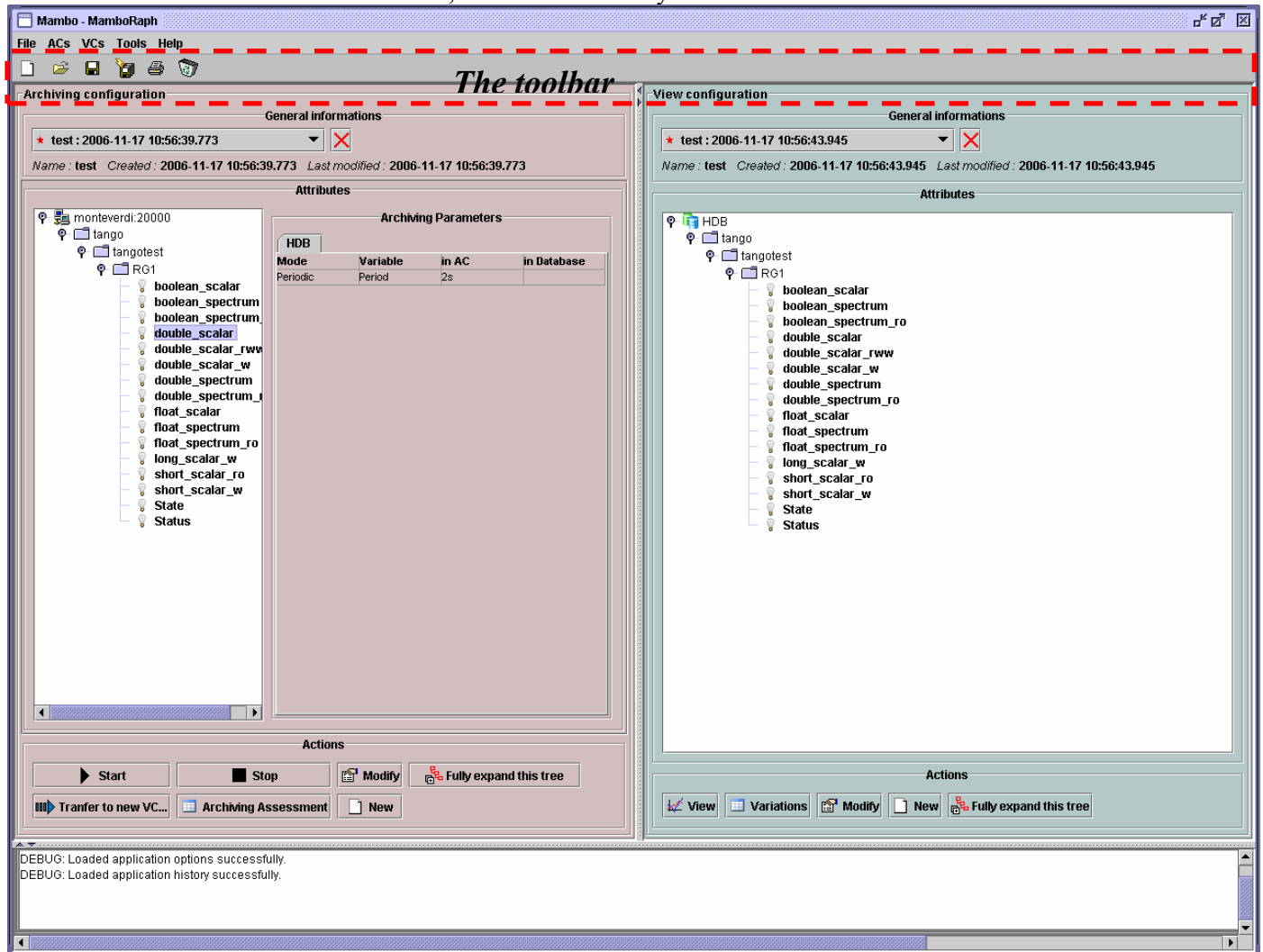


Figure 20: The Mambo toolbar

-  is a shortcut to creating a new AC/VC
-  is a shortcut to loading an existing AC/VC file into the current AC/VC
-  is a shortcut to saving the current AC/VC into an AC/VC file
-  is a shortcut to doing a saving all opened ACs and VCs
-  is a shortcut to printing the file representation of the current AC/VC
-  is a shortcut to removing all opened ACs and VCs from display

Annexes

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Archiving

The action of storing in database the values of Tango attributes in a time range, each value being associated with a time stamp.

Archiving mode

An archiving mode is a rule defining when an attribute has to be archived.

The most basic archiving mode is the Periodic archiving mode, where an attribute is archived every N milliseconds, no questions asked.

More elaborate archiving modes like the Threshold archiving mode ask for archiving when the attribute's value meets certain conditions, but they can only be used in association with the Periodic archiving mode.

AC

Short for an Archiving Configuration

Describes archiving for a set of attributes, by associating a set of archiving modes to each of its attributes.

VC

Short for a View Configuration

Describes plot properties for a set of attributes, by associating a set of plot properties to each of its attributes.

HDB

Short for the Historic Database.

Attributes values archived in HDB are stored forever.

TDB

Short for the Temporary Database.

Attributes values archived in TDB are deleted every [given deletion time].

VERIFIER QUE C'EST BIEN CA

Quick save/Quick load

The action of saving (resp. loading) to a default file. Called "quick" because no user interaction to choose a directory/file name is required.